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Copy 6 of 6

4 November 1963

MEMORANDUM FOR THE RECORD

SUBJECT : Trip Report

REFERENCE : Trip Report

1. The undersigned reviewed the progress of Contractor results are satisfactory, but continued emphasis on weight reduction on the KEMPSTER B system is necessary.

2. The laboratory version of the electron beam deflection system for switching the electron beam on and off the exit hole has been mated with the control circuit using an optical path between low voltage and high voltage portions. It is known that the PBS switching can be accomplished in about 0.05 microsecond. However, to date, the switching method using the optical path has not been refined so that beam switching in 0.1 microsecond has been attained. The more rapid switching will be attainable using the optical link, says the contractor.

3. Continued improvement is being made in the high-voltage portion control circuit described in the referenced memo. Smaller, lighter weight, high-voltage switching tubes are being assembled.

4. Contractor favors the Cockcroft-Walton circuit for the most intensive work at this time. While the undersigned concurs in this approach, he has, at the same time, emphasized the utility of keeping alive both the electro-static generator approach and the phase resonance transformer approach. This

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reasoning is based upon the need for alternate approaches if a weight impasse is met.

5. The focussing of attenuation to the Cockcroft-Walton approach when operated at the 3400 cycles/sec alternator frequency offers some good weight reduction possibilities. The solid state silicon rectifiers to be used are small, light weight, and are integral with, and weigh no more than, the circuitry wiring. Similar progress is aimed for in the capacitors in the circuit, possibly by the use of dielectric capacitors.

6. The PEB gun operation in the shielded betatron room has not been accomplished due to the continued installation of equipment. The undersigned has been assured that operation will begin very soon.

7. The cryopumping experiments have been successful and an adequate design has been made for this low-pressure pumping system.

8. The ejector pumping has been reduced in size by including two stages. Considerable weight could be saved if a larger air flow were available. Contractor is looking into this at LAC, Burbank.

9. High-temperature circuitry component work has been satisfactory in progress relative to size reduction and weight reduction.

10. The theoretical explanation of the PEB operation is rapidly taking form due to the efforts of [redacted] For the first time, it appears that a prediction of operation of a plasma electron gun at relatively high pressures is possible if the PEB has the configuration of a flattened "pill box." The undersigned has requested the contractor to investigate this promptly, because, in addition to the aforementioned characteristics, it would have rapid switching characteristics.

11. Contractor has the 170 Mc/sec wave guide mounted in the testing area. While the accessories such as pumps, etc., are being connected, the wave

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guide VSWR has been measured in the remaining sections. Preliminary measurements indicate a VSWR - 1.22 for a 6 db attenuation and about VSWR - 1.55 for a 20 db attenuation. The error of measurement of the former is about $\pm 1\%$ and of the latter, $\pm 30\%$ or higher.

12. Since the wave guide has been leak-tested in the shop operation under simulated altitude conditions will be possible momentarily. Contractor is aware of the need for prompt and accurate measurement of the attenuation of plasma.

13. An additional use of the waveguide will be made in such a way as not to interfere with the very important attenuation measurements. This problem is that of gaseous corrosion of the AR materials and the titanium alloys at simulated environmental conditions. The undersigned is working out this investigation with [] of LAC, Burbank.

14. Because of conflicts in travel plans, the second generation RF-powered accelerator was not discussed with [] Tentative plans are laid to discuss this within a fortnight. Contractor has assured the undersigned that significant progress has been made in this investigation.

15. Contractor has been concerned about the continued emphasis of the undersigned on weight reduction, particularly with the 50 lbs. target for the entire KEMPSTER B system. Admittedly, this is an extrapolation, but a plausible one. The existing "table top equipments" run about 175 lbs., including the projected weight of the water and water boiler for cooling purposes. Contractor "officially" believes that this cannot be reduced below 100 lbs. total. However, the undersigned believes contractor is "hedging" on the weight reduction. Conversations with individuals give a more optimistic view and the 50 lbs. system target not unattainable.

EAD/OSA []
Cy 1 - EAD/OSA (thru
ADD/SMT)

- 2 - AD/OSA
- 3 - D/TECH/OSA
- 4 - CD/OSA
- 5 - EAD/OSA chrono
- 6 - RB/OSA

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Engineering and Analysis Division
(Special Activities)

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